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In vitro study of the effects of green, red, and black tea and coffee extracts on the mammalian intestinal smooth muscle motility(contractions & relaxations)

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Abstract:

Tea, is the most consumed drink in the world. Green tea, is a non-fermented tea and it contains more catechins than black tea. Red tea is gaining recognition for its free of caffeine, low tannin, and it contains the antispasmodic principle . On the other side, coffee, is a highly acidic drink and it contains the highest caffeine, but tea provides only 1/2 – 1/3 as much. In the present study we tried to investigate the effects of green, red, black tea and coffee extracts on the mammalian intestinal smooth muscle motility in an attempt to rationalize some of their medicinal uses.

Segments of jejunum was isolated from rabbits intestine and submerged in Tyroid's solution which has the same compositions of extra cellular fluid of the rabbit, they were exposed to different volumes and concentrations of green, red, black tea and coffee extracts and the response were recorded by a lever inject ink on a slowly moving drum. Green tea and red tea extracts induced a dose-dependent inhibitions of spontaneous activity of the jejunum, they induced a significant decrease in the amplitude of jejunal contractions and relaxations (motility), while the black tea extract does not show any noticeable effect on rhythmic spontaneous jejunal motility.

On the contrary, coffee extract , induced a significant increase in the amplitude of the spontaneous activity of the jejunum in a dose-dependent manor. This study provides a mechanistic basis for the medicinal uses of tea and coffee.

Keywords :- Tea, Coffee, Smooth muscle, Motility, jejunum.

Introduction:

Tea, is a product derived from leaf and bud of the plant *Camellia sinensis*, which is a member of the *theaceae family* [1]. It is one of the most widely consumed beverage in the world today, and its medicinal properties have been widely explored[2]. There are two main kinds of tea which are non herbal and herbal tea[3]. Non herbal teas can be further divided into three basic types: black, green and oolong tea[4].

The polyphenols found in tea are more commonly known as *flavonoids* or *catechins* [5]. Black and green teas both contain similar amount of flavonoids [6]. The four main catechins in the green tea are: Epigallocatechins-3-gallate (EGCg), epigallocatechin(EGC), epicatechin-3-gallate(ECG) and epicatechin(EC) [7]. Green tea also contains: Gallic acid and other phenolic acids such as chlorogenic acids, caffeic acid and flavonols such as kaempferol, myricetin and quercetin[8]. In black tea the polymerized catechins are theaflavins and thearubigins predominate[9]. Tea, whether cold or hot contains the same polyphenols [10], also it contains the similar caffeine, which is an alkaloid compound and is one of many alkaloids, including Theophylline and theobromine that occur naturally and in varying amount in tea leaves and coffee[11]. These compounds act as stimulant to the cardiac muscle, respiratory system, and the central nervous system[12]. They also act as a smooth muscle relaxant, diuretics and vasodilator[13]. Rooibos tea, which means red bush tea (also known as *aspalathus linearis*) is a leguminous shrub with needle- like leaves[14]. Its beverage with a characteristic sweet flavor, is rich in